ANSWERS™

The Magazine for Tandy® Computer Customers

**Industry Perspective:
Bringing it to the table**

—Page 12

Fall Issue

Partners

Would you take on a business partner without his or her total commitment to your company's success? Not likely. Nor should you choose a computer system without knowing you have total commitment from the seller.

With Tandy computers, you absolutely get total commitment from a total company. Our engineering staff takes pride in designing state-of-the-art products, exemplified by our recent introduction of four innovative PC-compatible computers.

The commitment continues in our manufacturing process with quality control checks every step of the way. We even continue testing our products after they are in the marketplace for continued quality assurance.

We ship *our* products to *our* stores, from *our* warehouses, and, for the most part, using *our* transportation system. Service and training are provided by *our* nationwide support network, not someone else's. You won't find that kind of commitment from anyone else in the industry.

Any good business partner knows that it takes this kind of commitment to be successful in today's marketplace where technology can be vital in getting an edge on the competition. The companies featured in this issue know Tandy computers give them that edge.

We're uniquely committed to you, our business partner, and to your success. We're committed to providing excellent value in terms of features, functions, benefits and unequaled price performance. All that backed by a three billion dollar corporation which this year marks sixty-six years of success.

We're in business for business and we're just simply the best business partner you'll ever have.

John V. Roach

—John V. Roach
Chairman, CEO and President of Tandy Corporation

NOTES
FROM THE EDITOR

What's the issue?

"Hitting the books, high-tech style" in the Techniques, Etc. column of our Summer 1986 issue, made reference to a "technique described in *Portable 100/200* magazine". The referenced article was entitled "The Model 100 meets the Big Blue Machine" by Richard Ross, Jr. and appeared in the August 1984 issue of *Portable 100* magazine, a Camden Communications publication. Camden may be contacted in writing at P. O. Box 250, Camden, Maine 04843 or by phone at (207) 236-4365.

Computing is divine

Many suggestions for our articles come to us from our Radio Shack Computer Centers on questionnaires we supply which are often filled out by satisfied customers. One such questionnaire from The Abbey Of Genessee in Piffard, New York, provided what may be the ultimate reason for using a personal computer. Father Raymond, the Abbey's vice president of accounting, indicated his "firm's" primary business or service was "Praying for the world and making Monk bread". Seems the Abbey uses Model IIs, Model 12s, a Tandy 16B, a Tandy 6000 and assorted Tandy printers for accounting, word processing for students at the Abbey, and even in the bread bakery where the computers are used to determine the mix.

The questionnaire also asks what benefits have resulted from using a computer. Father Raymond's reply was nothing short of eloquent: "Time savings. More time to pray."

Can do

Our Computer Center in Yonkers, New York, wrote us about an enterprising eleven-year-old who took advantage of a law passed in New York State in 1984 which required a five-cent deposit on soda cans and bottles. Manhattanite Gary Strauss spent a year and a half collecting 33,595 cans and saved the deposit money toward buying his own computer. Last December, his efforts paid off and he bought a Tandy 1000 with a color monitor and a DMP-130 printer. According to Gary, he uses his system for homework, games and printing banners and signs. Just goes to show, it *can* be done.

PRESS REVIEW

The five new Tandy computers announced this past July received a good deal of attention from the press. In part, the attention focused on the impact of the products in the marketplace.

"We believe this Christmas will bring strong demand from the home market for IBM-compatible computers. With the new Model 1000 line as well as an enhanced Color Computer 3, Tandy is best positioned to capitalize on this trend.

"In addition, customers can be confident of the quality and compatibility of Tandy products as well as the company's long-term commitment to the business and ongoing support of its users."

—Michele S. Preston
Investment Analyst

"One low-priced DOS-compatible computer, however, has succeeded in making a major change in the marketplace, one that will have long-term implications for companies like Apple and Commodore. That computer is the Model 1000 from Tandy Corp."

—Stewart Alsop
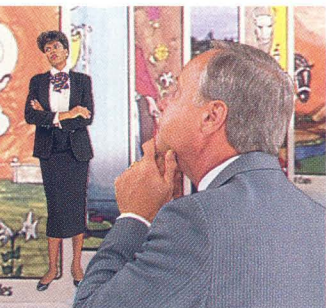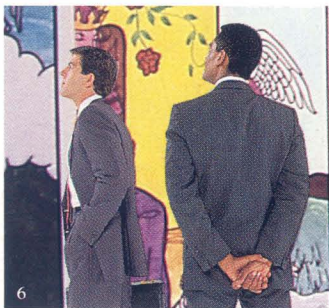*Computer Currents*
June 30, 1986

ANSWERS

CUSTOMER PROFILES

MARKET REPORT

TECHNIQUES, ETC.

INDUSTRY EXCLUSIVE

FOCUS ON TANDY

FOCUS ON EDUCATION

Making it to the top:
Scaling the Seven Summits
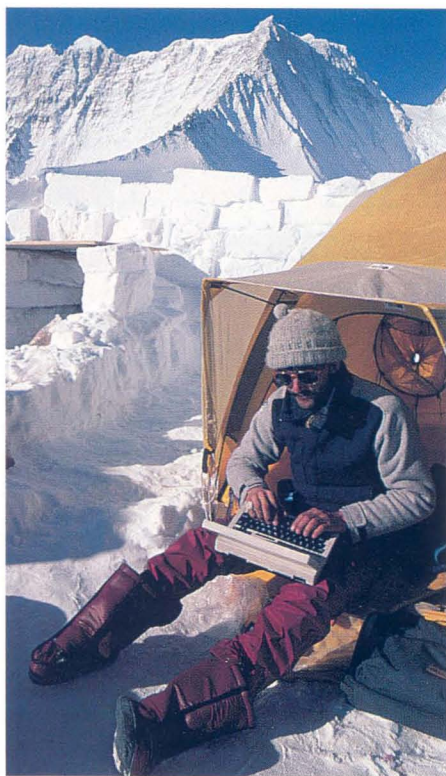
Patrick Morrow catches up on his notes at the Mt. Vinson Massif Base Camp.

From sub-zero to sub-tropical climates, explorer Patrick Morrow finds the Tandy 200 portable computer is truly an "expeditioner's friend."

Base Camp, Antarctica. The temperature outside is well below zero. The wind, gusting at hurricane force, assaults the small nylon shelter like an invisible army. Looming above is Mt. Vinson Massif, whose 16,067-foot summit is the quest of an international team of mountain climbers.

Located well inland on the icy continent, away from the playful penguins and research stations populating coastal areas, Vinson Massif presents a monumental challenge to climbers. Because of its remote location and arduous weather conditions, scaling Vinson Massif requires not only physical fortitude, but delicate political and logistical maneuvering as well. It also includes massive financial backing— Morrow's initial expedition cost was more than $250,000.

It is November 1985. Patrick Morrow, co-leader of the assault on Vinson Massif, is sitting in the tent plotting out plans for the ascent. Just a year ago, Morrow was encamped at a coastal base on the Antarctic peninsula, ready to make the long-anticipated climb. That expedition had to be suddenly abandoned when horrendous weather conditions were on the verge of demolishing the airplane and equipment. Morrow—photographer, writer, mountain climber and all-around adventurer—knows that time is running out. Climbers rarely get a single chance to stand atop the highest peak in Antarctica, let alone a second chance.

Laptop at the top

To make matters even more tense, Morrow's publisher is awaiting the final chapter of a book depicting Morrow's quest for the Grand Slam of mountain climbing—scaling the highest peak on each of the seven continents. Morrow has been pursuing this goal for the past eight years. Vinson Massif is the second to the last hurdle.

Taking advantage of some quiet time at base camp, Morrow is furiously jotting down notes and observations, his Tandy 200 portable computer balanced comfortably on his lap. Fortunately, the ascent turns out to be a success with the wind so gentle at the mountain summit that the explorers have to hold open their flags for celebratory photographs.

Months later, sitting around the kitchen table at home in Kimberley, British Columbia, a town nestled in the Canadian Rockies about an hour's flight from Vancouver, Morrow recalled the excitement of the expedition. Writing about his adventures has

Michael Dunn of Adventure Network takes a few minutes to warm up aboard the expedition's aircraft.

become an integral part of his work. And writing entails deadlines, even if you are an explorer hopscotching the globe. "I realized there is an incredible amount of downtime in travel—in hotel rooms, airports and on planes. I had wanted a portable computer for a long time, but was too busy to do anything about it," Morrow explained.

That was until deadline pressure for an article on the Antarctica climb for the Canadian magazine, *Equinox*, and the next to the last chapter of his book, spurred him to contact Radio Shack on the day before he left for his second trip to Antarctica. (Morrow's book, *Beyond Everest—Quest for the Seven Summits*, was published in October.)

"Glen Nishihata from the Radio Shack store in Vancouver gave me an instruction book and I tore out the section on word processing, but I had to phone back from Chile to find out how to access the additional memory," Morrow recalled. Other than that little glitch, Morrow has had no problems using the portable. "I left the 200 stored at base camp for nine days and it was totally frozen, but when it was warmed up again on the plane, the memory held," Morrow said.

Barely back from the Antarctic expedition, Morrow and his wife, Baiba,

a skilled mountaineer, writer and partner in most adventures, received clearance from the Indonesian government to climb Carstensz Pyramid, the highest peak in the Austroasian continent. The couple had already climbed Mt. Kosciusko in Australia (altitude, 7,310 feet) and had already included that experience in the book, but the opportunity to scale Carstensz (altitude, 16,023 feet), a peak generally closed to outsiders, was the culmination of a two-year ordeal of red tape to receive permission for the climb. Again, a pressure situation—another chapter of Morrow's book would have to be rewritten.

Deadline for adventure

Morrow was particularly eager to include Carstensz in his account because it had been overlooked by other climber/explorers who were pursuing a similar Grand Slam of mountaineering project.

Again, out came the Tandy 200—this time destined to a steamy jungle environment. Traveling with a portable system is easy, the Morrows agreed. It can pass through an x-ray screening device without losing memory, and the portable operates with a battery which eliminates hassles with variations in electrical currents. When working at remote locations, the Morrows take notes with the portable computer, every so often dumping the text onto a voice tape that stores it in digital

format. The information is later transferred to a computer in their office at home. This convenient method allows them plenty of storage space on the portable for notes and article writing. In addition to their journalistic endeavors, the Morrows use the Tandy 200 for scheduling. In Antarctica, for example, Pat Morrow was juggling three groups of eight climbers, scheduling their arrival times and managing information on the expedition's fuel and food requirements.

When not writing about their adventures for various magazines, the Morrows are busy planning them. Usually they work at the kitchen table, a focal point where friends frequently drop in for a cup of tea, good conversation and an impromptu slide show. On any given day, a phone call may bring a proposal for a new adventure such as recreating a hike that was made across China in the 1930s.

Recently, they and four friends founded the Adventure Network, Inc., an adventure travel company. "What we are doing is creating a vehicle for ourselves and other people to see the world . . . to go out and have fun and not step on other people's toes," Pat Morrow noted.

There is little doubt the Morrows are seeing the world—now with the Tandy 200 portable in tow. As Baiba Morrow observed, "We have a portable life style."

Computing is for the birds

Portable computers have proved invaluable on more than one Antarctic expedition. The Model 100 was the informational mainstay of a research team devoted to a four-month study of Adelie penguins at Cape Bird, Ross Island, Antarctica.

Headed by Dr. Lloyd Davis, zoologist with the New Zealand Department of Scientific and Industrial Research, the team was composed of members of the New Zealand group

and Australia's Commonwealth Scientific Industrial Research Organization. Project sponsorship was also provided by the U.S. Center for Field Research.

Tasked with observing the nesting and feeding behavior of penguins, the team recorded data on the Model 100 every fifteen minutes of each day, encoding 20,000 bytes of information per day. "The Model 100 was chosen because of its ability to handle massive inputs on cassette storage facilities, its large LCD screen and the ease with which data text can be edited," Dr. Davis noted in an article in the *Auckland* (New Zealand) *Star*.

Dr. Davis wrote the program for data logging and was pleased with the results. "Without the Model 100, we'd have just a stack of meaningless numbers. With it, we can give meaning to those numbers, using the computer to organize and analyze our data. The Tandy is terrific!"

Fate of the industry: Deciphering the

Factors that will influence the future of the personal computer marketplace.

By the year 1990, the computer industry is projected to be a $50 billion industry according to industry watcher Future Computing. Despite a downbeat attitude which has permeated the trade press for the past few months, the depression in the computer industry is all but history. Overall, the industry has continued on the same strong growth curve it began in 1980, with the volume in large mainframe system installations fluctuating and the volume in small and medium system installations maintaining steady growth. (Figure 1) No cross-section of the industry, however, has recorded such a sustained growth pattern as that of the personal computer industry, now heralded as the number one computer business.

This past spring, Future Computing announced that Tandy computers have moved from fifth place in 1984 to the number one position in 1986 in terms of PC-compatible sales, followed by Compaq, AT&T, Sperry and NCR. (Figure 2) The report projects that in the last half of 1986 and in 1987, PC-compatibles will outsell IBM PCs, and that by 1990, the industry will see a ratio of two compatibles sold for every IBM PC sold.

Healthy outlook

Prorating the $50 billion projected for 1990 in terms of current end user value, nearly 11 million personal computers will be sold and installed in the U.S. market in 1987, equating to a $30 billion potential in the industry. Put in a different perspective, industry indications are that in 1987 the average value of a personal computer will be $2755 and will increase to an average value of $3095 by 1990.

Not to be overshadowed by the hardware segment of the industry, the software market will represent an $8 billion industry in 1987, growing to an $11 billion industry in 1990. From a standpoint of units, 75 million pieces of software will be shipped in 1987 at the rate of 7.5 pieces sold per personal computer, including installed-base units. The average value of a software offering in 1987 will be $106.

With forecasts of such volumes, it would seem that the marketplace would be well penetrated if not saturated. However, industry analysts still maintain that the personal computer industry is moving from the penetration in 1984 of just under 5 percent to a penetration of just under 15 percent by 1990, even in a projected $50 billion market. (Figure 3)

Factors which will help this growth trend remain constant are continued end-user demand and technology. As home users and small and medium-

Wheel of Fortune
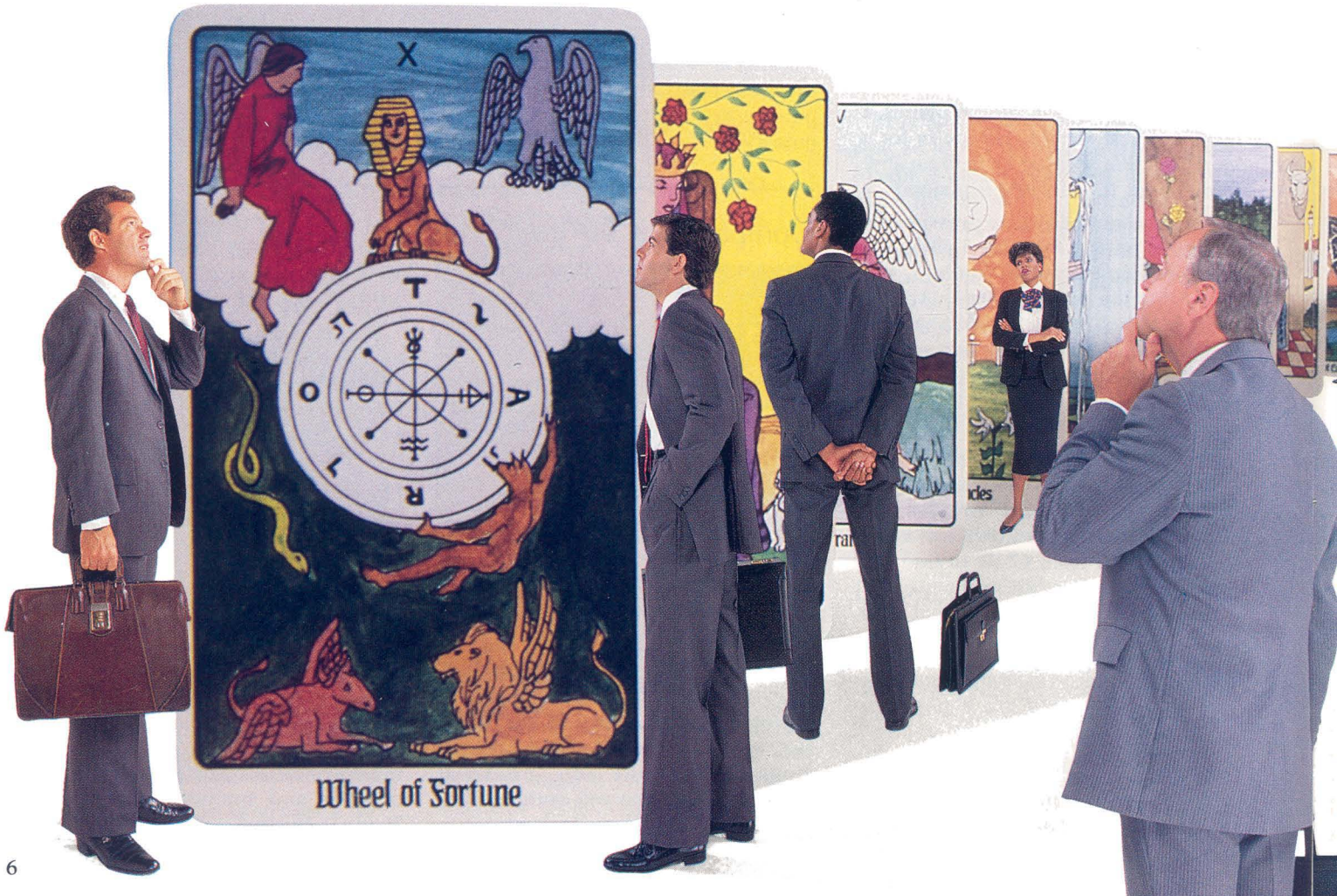
signs for success

sized businesses regain their confidence in personal computers, and as the downturn in the cost of technology continues, users will benefit from more usable computing power for their money.

Major markets

The personal computer industry today consists mainly of three major market categories—home, school and business. (Figure 4) Amid reports of manufacturers who disclaim the existence of a home market, the potential is clearly a reality. In fact, it is big business in light of a potential customer base of 91.3 million households.

From 1986 to 1987, the home market is expected to grow by 22 percent. Additionally, in 1986 there were approximately 20-21 households per hundred with a personal computer. By 1989, it is estimated that just under 38 households per hundred will have a personal computer. Interestingly, the penetration per household does not reflect the same growth rate in terms of percentage of households, increasing from 18 percent in 1986 to only 32 percent in 1990.

While this phenomena may remain an enigma, it appears that a trend toward a two-computer household may be evolving. During the initial advent of personal computers into the home environment, many users purchased totally independently of what they were using in their office or school environments. Most were incompatible, in many cases, even with their successors. As the MS-DOS standard became established, many users discovered that they desired the ability to transcend the gap between home and office or school use.

...students will be influential decision makers...

Software applications in the home market are dominated by productivity such as word processing and home accounting, entertainment and home education respectively. (Figure 5) As technology continues to enhance the "user-friendly" aspect of home computing, the 91.3 million households are projected to generate a $5.3 billion industry in 1987, absorbing an estimated 4.4 million personal computers. In 1987, the average value of a personal computer sold in the home marketplace will be $1205, increasing to only $1298 by 1990.

Future responsibilities

The education market takes on a special importance in terms of students as a body of future influential decision-makers. As many businesses recruit graduates, it is those graduates that will eventually be responsible for purchase decisions. Compared to the potential of 91.3 million households, 102,000 kindergarten-through-twelfth grade schools and 3,300 colleges and universities may seem to pale in terms of market strength. However, those 105,300 combined educational institutions house between 56 and 58 billion potential computer users who will spend $1.5 billion in 1987, purchasing just under one million personal computers for school use. In 1987, the average value of a personal computer in the classroom will be $1875, increasing to just under $2100 by 1990.

Outlook for the eighties
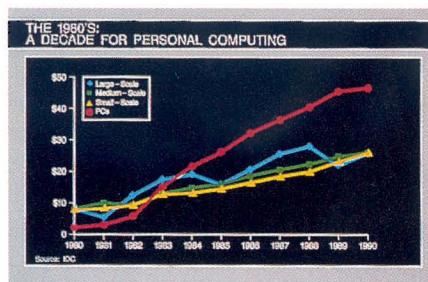

Fig. 1

Compatibles to outsell IBM

Fig. 2

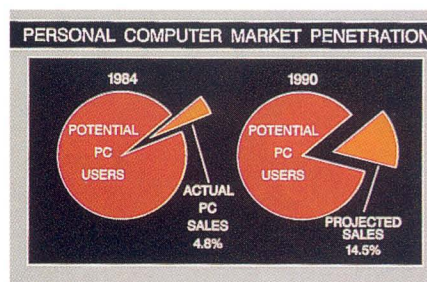### Strong market potential

Fig. 3

Down to business

The business market represents possibly the largest growth potential in the personal computer industry today. Categorized into three segments— small-, medium- and large-sized business concerns, the small to medium segments far outnumber the large business segment. In America, there are over 5 million small business establishments and approximately 150,000 in the medium-sized category compared to 8,000 large scale companies.

In a recent report, The Gartner Group stated that prior to 1986, IBM held a dominant 45 percent of the small to medium business computer market. (Figure 6) The report further noted that in 1986, IBM has dropped to almost half of its prior position and that Radio Shack and its Tandy computers had moved from a 20 percent to a 30 percent plus position in that market segment.

In another market study, Future Computing estimates that small businesses alone represent a $5.5 billion market with 1.5 million personal computers to be installed in 1987. Potential in the medium-sized business segment is estimated at $4 billion with just under one million computers sold.

Together, these segments account for nearly 43 percent of the total personal computer business marketplace.

The 8,000 large businesses are targeted to purchase just under two million personal computers in 1987 at a market value of $7.5 billion. Adding another $6 billion in volume from government concerns, the total business

...companies must offer more than just product...

market represents $23 billion in 1987—five times the size of the projected home market, and twenty times the estimates for the education market. With the average cost of a personal computer in the business segment slated to move from $4148 in 1987 to $4344 in 1990, the business market represents a respectable share of the total potential.

Success formula

While end-user demand continues to drive the personal computer industry, the ability of the computer manufacturers to perceive and fulfill the differences in the respective needs of

the home, school and business users will ultimately determine their success. The home market will require an entry-level, user-friendly computer capable of expanding with the needs of the household. The education market will require computers which can be enhanced with specialized components indigenous to classroom use such as headphones, security devices and networking capabilities. Due to its vast scope, the business market may well be the hardest to accommodate as requirements will range from ease of use for clerical and inventory personnel to ultimate sophistication in networking and communications.

Companies that want to be truly competitive in any one of the three market segments will have to offer more than just product. As the future of the computer industry unfolds, end-users will expect, albeit demand, quality responsiveness to their support needs, whether they be installation, on-site service or training. Expandability, software and hardware availability, and service and support—all are elements that must be provided to meet the demands of end-users and to offer them complete solutions in their computing environment.

Fig. 4

Fig. 5
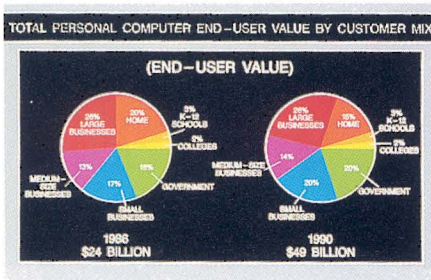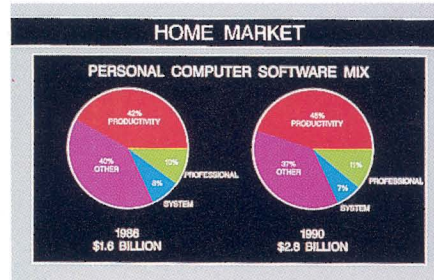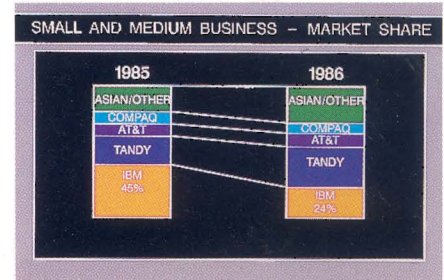

Fig. 6

No Nonsense Negotiations

The financial analysis business is one that leaves no room for chance, especially when dealing with damage suit settlements where a single mathematical error can mean thousands or millions of dollars to an attorney's client.

Dr. Richard Siegel, president of Applied Economics in Boston, Massachusetts, is a financial analyst who spends most of his time working for attorneys who are negotiating damage claims. "In a lot of situations, the attorney is negotiating a payment schedule for his client," Siegel explains. "My job is to input the numbers and simulate what the payments would be over, say 30 or 40 years."

In addition to settlements, he creates sensitivity analyses which reflect the effect of interest rate fluctuations. "I've got to be able to tell the attorney what would happen if the discount interest rate would change $1/2$ or even $1/4$ percent. In other words, 'How sensitive is this amount to changes in the interest rate?'"

Because he spends a lot of time sitting at a negotiation table, real-time support is very important. Siegel uses a Tandy 200 portable computer to provide immediate answers to "what if" questions inherent to such discussions. "It's kind of nice to be able to sit at a table with a bunch of lawyers who are trying to negotiate a settlement and be able to input numbers into my Tandy 200 for immediate answers," he says.

In his office, Siegel uses three Tandy 2000s, a Tandy 3000, a Tandy 1200, and several Tandy printers to provide him with calculations within 30 seconds that used to take two or three days to figure by hand. "A lot of our work deals with 'what ifs'," Siegel says. "With Tandy machines, we are able to do a sensitivity analysis in much less time."

Employees at Applied Economics use several programs to accomplish their tasks, including word processing, databases and a custom accounting program. "We are highly computerized," Siegel adds.

Siegel shopped around before buying his first Tandy 2000 three years ago. He says it was the excellent service and support he received on his first machine and the company's reputation for reliability that led him to purchase five more Tandy computers. "The machines have definitely paid for themselves through a savings of manpower and an increase in productivity."
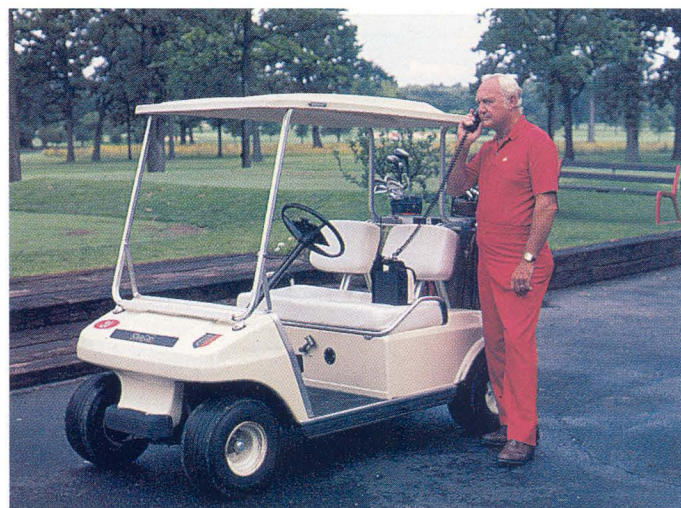
Legal asset

"In our business, you've got to be in touch all the time," said Chicago attorney, Richard French, whose business is the law firm of French, Rogers, Kezelis and Kominiarek. "Our success hinges on our ability to be mobile, to be reached if something occurs."

That something could be a dramatic change in the status of one of French's insurance, medical malpractice or product liability cases. Or it could mean a case will go to trial on very short notice.

As French conducts a good deal of his business by phone and is frequently out of the office, he decided to get a cellular phone which would afford him more freedom of movement. After shopping around, he decided on the Radio Shack Transportable Cellular Telephone.

It is this phone's transportability that makes it a perfect device for individuals like French. It can be easily removed—it weighs only ten pounds, including its transportable battery pack—and placed on a boat, golf cart or anywhere a professional may require timely accessibility.

"Radio Shack hooked me up with Ameritech (the Bell system's cellular carrier) and within an hour I had a telephone number," French recalled. Because Ameritech is part of the Bell system, French can easily travel from one cellular area to another. He also liked the price of the Radio Shack Transportable Cellular Phone, and noted that it was about $1,000 less than units offered by other manufacturers.

Now French can do business with anyone, any place in the world, anytime, as long as he is within about a 60-mile radius of the city. With the help of Ameritech, he can talk with anyone anywhere just as if he were using the phone on his desk. Concluded French, "I feel like I can do things now I couldn't do before. I can take my portable phone and not have to worry."

Computing the bottom line in Georgia
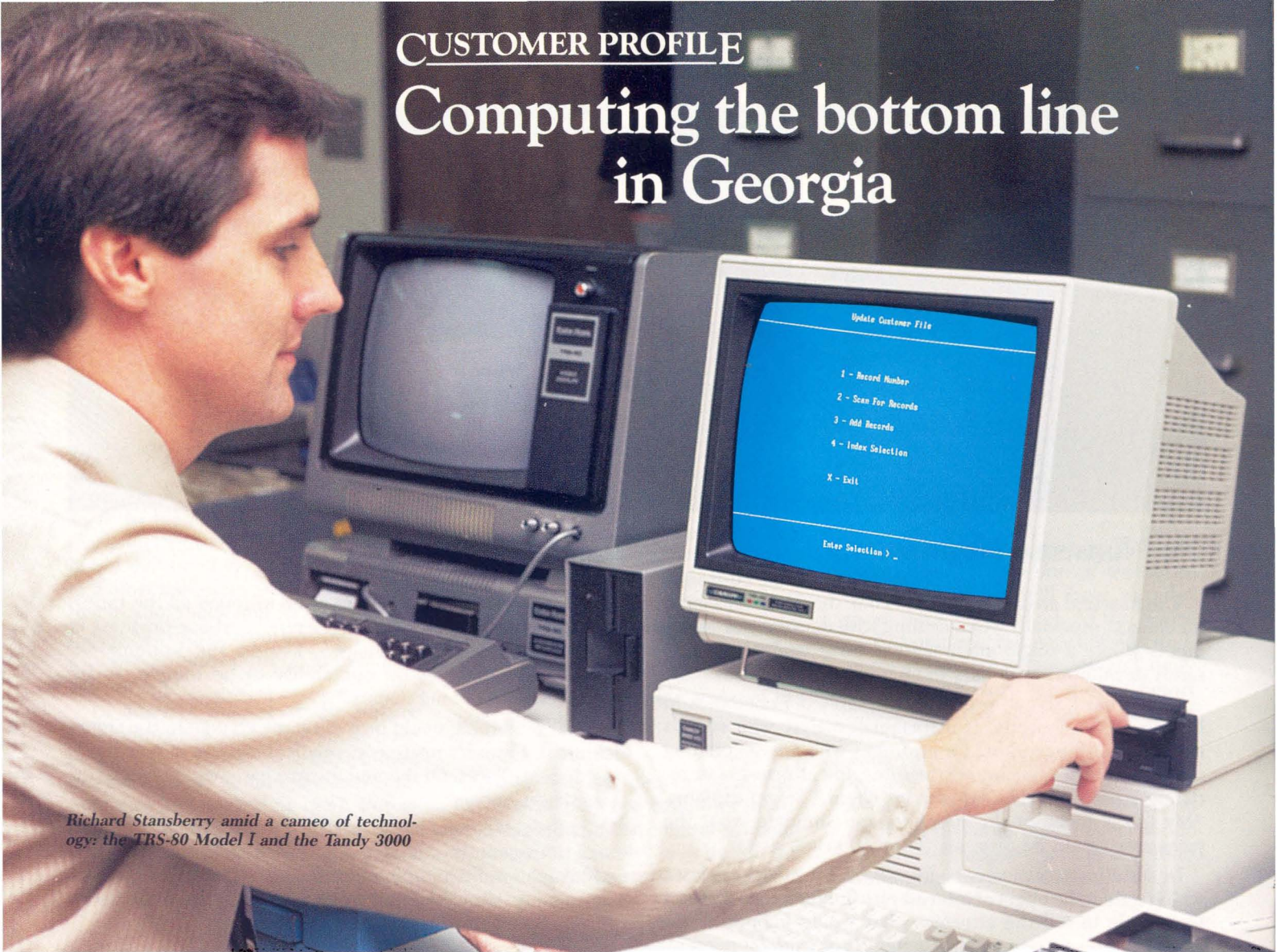
Richard Stansberry amid a cameo of technology: the TRS-80 Model I and the Tandy 3000

From field input to final output, Tandy computers help the Department of Revenue solve its taxing problems.
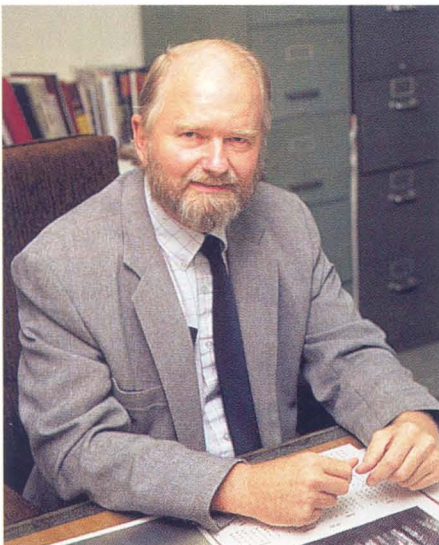
Jerry Dockery began his division's computerization with a programmable calculator.

Like other parts of the Southeast, the state of Georgia is booming. You need look no farther than the state's showplace city of Atlanta to see what is happening in Georgia—it is sophisticated, bursting at the seams economically, and boasting more than its share of major attractions.

One of the fuels that sustains this growth and development is money, including a healthy influx of state tax revenues. Making sure that all the tax revenues due are actually paid is the responsibility of the Central Audit Division of the Georgia Department of Revenue. The Central Audit Division, based in Atlanta, has a total of 111 employees, including 100 auditors. The group is responsible for overseeing and administering audits for state income tax, sales tax and motor fuel tax—no small job for a state with as much economic activity as Georgia.

While being a tax auditor might not make someone the most popular guy on the block, it is an important job.

Until recently, all of the raw data on field audits was gathered by hand, a tedious, laborious process, which begged for automation. Thanks to the efforts of Jerry Dockery, the assistant director of the Central Audit Division, today auditors are using a combination

...he instinctively felt computers were the answer...

of Tandy desktop and portable computers to make their work much more productive and efficient.

Row after row . . .

Dockery described some of the factors that convinced him the department needed to computerize. "In the old days, we had auditors going out with 4-column pads and listing row

after row of purchase order information, transaction dates, amounts and so on. And all their information had to be in chronological order, with total dollar amounts by month," Dockery said. To make matters worse, all of this information had to then be transferred—by hand—to a 13-column pad for yearly totals.

Auditors usually did a 36-month audit entailing a minimum of 144 separate calculations. The process took at least three to five days, which severely limited the number of cases an individual auditor could handle.

Dockery felt there simply had to be a better and more efficient way for the auditors to do their jobs, and he instinctively felt that computers were the answer. Undaunted by the fact that he had no computer background, Dockery looked for a solution.

Colette Brown searches for information stored amid a stack of hard drives.

As a first step, Dockery borrowed a programmable calculator from another state department, taught himself BASIC programming and eventually "made the machine do what I wanted." Even though the calculations had to be transferred manually, they were at least accurate and could be completed more quickly.

With the demonstrated success of using even a "primitive" computer, Dockery was then able to obtain funding for a Radio Shack Model 16, which was later followed by two Model 4s (in 1982) to help relieve what quickly became a "bottleneck for use of the computer." Dockery transferred his initial program to the computers (adding a few enhancements along the way) and also added a wide carriage printer for

summaries and reports to alleviate manual transfer of data to report forms.

The results of the first modest attempts at automation were very encouraging, but Dockery still felt there was a lot of room for improvement. He began exploring ways to automate the remaining manual procedure—data collection in the field.

Dockery looked at the options available and felt that the portable Radio Shack Model 100 would be perfect for field work. In 1984, he obtained six portables, and, using the Model 100's built-in BASIC language, developed a data collection program that was a standardized, electronic form to replace the non-standard, manual methods that auditors had been using.

To say that the project was rewarding would be a tremendous understatement, according to Dockery. He felt that the integration of the Model 100s with the desktop computer was a perfect solution. "It was just a tremendous time saving for us," he said. He added, "we cut a process that was about five days of manual work down to literally a few minutes once the data was in the Model 100."

Strength in numbers

Because Radio Shack's computers have worked so well for the Central Audit Divison, Dockery added equipment as rapidly as budget constraints would allow. The division currently uses 70 Model 100s, along with seven Model 4s, numerous Tandy printers, and five new high-performance Tandy 3000s that Dockery is planning to tie together in a local area network. "One of the advantages of the Tandy 3000 for us," Dockery commented, "is that it can read files directly from the 3-1/2 inch disk drives that work with the Model 100s by using a special adapter and software from Traveling Software. This will make exchanging data from the portables to the desktops even easier than it is now."

Based on the sheer number of Tandy products in use at the division, it is not surprising that Dockery is a loyal supporter of Tandy computer products. "When we first looked for machines, Radio Shack was the only computer company that really had a good business product and a complete solution," said Dockery. The division buys all of its products locally from the College Park Computer Center. "We have
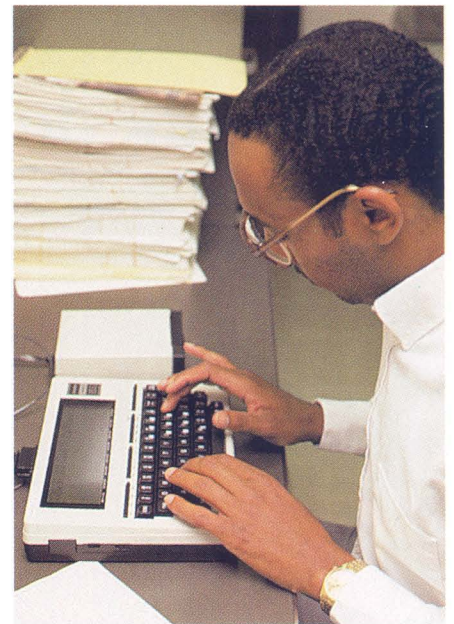
Michael Harmon reviews audit data on the Model 100.

found the equipment so reliable that we never even got a service contract," he said. In fact, the original Model 16 (which Dockery said is "so old it has a two-digit serial number") is still in use.

Besides performance and reliability, Dockery is impressed by the value that Tandy computers provide. "There are some departments that have budgeted $9,000 for the purchase of a complete IBM PC/AT system," he explained. "I can get a Tandy 3000 system for less than half the money—and it's faster and has more features. Tandy is simply the best buy for the money."

Ample justification

While the division may not be a private business, the bottom line is still dollars and cents, and Dockery feels that automating has certainly had an impact. "Our collections have gone up significantly since we began using the Tandy computers," said Dockery, "While our expenditures have only gone up slightly."

Now that computers have relieved auditors of unproductive tasks, the amount of revenue collected per auditor has improved. Last year, $49 million in taxes were collected as a result of some 3,000 audits performed by the audit division.
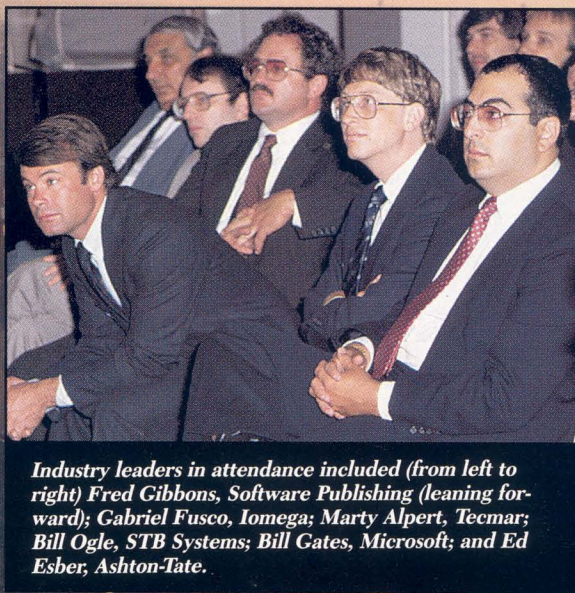
The auditors apparently feel just as strongly as Dockery about the help they have received from the Tandy products. "They said that if we took their Model 100s away, they would buy their own," Dockery noted happily.

11

New York, New York!
Table talk downtown

Tandy's President, CEO and Chairman John Roach.

Industry leaders in attendance included (from left to right) Fred Gibbons, Software Publishing (leaning forward); Gabriel Fusco, Iomega; Marty Alpert, Tecmar; Bill Ogle, STB Systems; Bill Gates, Microsoft; and Ed Esber, Ashton-Tate.

Top executives from the industry discuss their business as Radio Shack introduces its new computers.

It may have been a rainy day in New York City, but inside the Waldorf Astoria Hotel, the atmosphere was anything but glum as Radio Shack introduced five new computers at a press conference on July 30, 1986.

With some 200 members of the computer media and financial analyst communities in attendance, top executives from Tandy Corporation and its Radio Shack Division unveiled four new PC-compatibles (see Summer, 86 ANSWERS), a Color Computer 3, two new software packages, three printers, and an aggressive new marketing/training program aimed toward making Tandy computers a leader in the marketplace.

Noting that the issue of PC-compatibility has become passé, Tandy Corporation President, CEO and Chairman of the Board John V. Roach told the group that the marketplace "is driven by better value and product innovation that goes far beyond PC-compatibility." Roach emphasized the company's plans to enhance its presence in the business segment of the market through a 1500-strong outbound sales force.

Industry notables

Radio Shack had definitely put together all the elements for success. But then, success was the prevalent order of the day evidenced by a prestigious group of industry leaders who had front row seats to the proceedings. On hand were Bill Gates, CEO, Microsoft Corporation; Ed Esber, president, Ashton-Tate; Jim Manzi, president, Lotus Development Corporation; Fred Gibbons, president, Software Publishing Corporation; Gabriel Fusco, president and CEO, Iomega Corporation; Marty Alpert, president, Tecmar; and Bill Ogle, president STB Systems, Inc.

In addition to being in the forefront of the computer industry, these companies are major suppliers for Radio Shack's Tandy computer line and did, indeed, have comments regarding the announcements and the industry in general during an informal discussion. Overall, the leaders agreed that the new Tandy computers should put Radio Shack in an excellent position in the marketplace.

Of the Tandy 1000 EX, targeted for the home, school and small business markets, the group agreed that with the EX and the new Color Computer 3, Radio Shack will increase its marketshare in those arenas. "There just aren't that many players in the low-end environment. The EX will work in that market and the Color Computer offers performance and value," noted Gibbons.

...the key to the market is service and support...

Getting down to business

"As time, technology and the business users progress," explained Gates, "we near the point where PCs approach the sophistication and capability of minicomputers." Manzi concurred stating that "several big-business users are already using PCs in a simulated front-end device capacity. These people are looking for speed."

Manzi's comment spawned a discussion of the 80386 versus the 80286 microprocessor. "There's not a lot of software out there that takes advantage of the 386 capabilities. Therefore, most business users today don't cur-

Reporters encompass John Roach with a barrage of questions.

A light moment in the discussion among (from left to right) Bill Ogle; Bill Gates; Graham Beachum, Radio Shack Computer Merchandising; Jim Manzi, Lotus; and Gabriel Fusco.

rently need the enhancements resident with the 386," noted Gates. Said Manzi, "It's more of a prestige thing. Consequently, in this case, the users are driving the market."

"Radio Shack's in a good position in that market," said Ogle. "But the key to the market is service and support, and that's where Tandy (Radio Shack) seems to excel." Added Alpert, "Yes, and the new aggressiveness toward the business market—the outbound sales force and training program—will help improve their image as viable alternatives in that market."

"True," chimed in Gates. "The CPUs are like record players to us (software developers). We just sell 'records'," he grinned. "But we don't ignore the fact that business users look beyond the applications factor, and Tandy certainly goes beyond that in terms of support."

Speaking of software

There's little doubt that the software arena is currently awash with a compendium of offerings ranging from business packages that cost thousands of dollars down to generic efforts that sell in the $50 range or, in some cases, that are free. "Of course there's been a shakeout," said Gibbons. "When you have everyone, including the local programmers, out there creating software—often duplicating efforts—something's gotta give. Price is an important factor, of course, but users are getting more sophisticated themselves. They're being a little more selective."

"It depends a lot on the application, too," added Alpert. "Your CAD user, for example. He'll pay whatever is necessary to get the features he wants—and needs—for his application."

Manzi felt that, again, the aspect of prestige is prominent as it relates to software, noting that many people have to try whatever new utility may be in vogue. "That's not to say that there isn't some very serious software out there in the under $100 range. The benefactors are the home and small business users. After all, not everyone really needs integrated, relational software."

Software monopolies? Not that likely, agreed the group, citing that there will always be a need for enhanced applications, particularly in the vertical markets and in the communications area, which continues to become more sophisticated as the trend moves toward total voice and data systems integration.

Strictly hardware

"We're probably a little bit behind on the storage curve," said Alpert wryly noting that micros and their users continue to consume whatever memory capabilities are available and still want more.

Fusco concurred, commenting that it's not that improbable to someday utilize a disk cartridge system on a Color Computer. "We're already looking into some of the options that have become more feasible in the market. We're experimenting with optical recording, for example. With the technology now—and in the foreseeable future—the possibilities seem limitless." Ogle felt the same was true for graphics as users and their applications become more sophisticated.

Hardly dull

Without exception, these industry front-runners see more excitement ahead: New developments in CPUs and storage devices, in operating systems, applications and even entertainment software, and in communications systems.

They also agree on one other point: Whatever happens in the continuously unfolding computer industry, Tandy computers will be there.

13

Thoroughly modern Mozart

A unique new system helps move music typography from the Renaissance Age into the Information Age using personal computer technology.

Nestled away in what used to serve as the home for the president of Stanford University in Stanford, California, is the Center for Computer Research in Music and Acoustics (CCRMA), which has served as the prototype for other computer music facilities. In these halls of academia, several major musical advances have taken place. The most recent development involves using the Tandy 2000 personal computer to produce professional quality manuscripts.

Thanks to the graphics capabilities of the Tandy 2000 and a newly designed music typography system, composers now have an inexpensive means of publishing their musical works.

Developed within the last year for the Tandy 2000 by Dr. Leland Smith, a professor of music at Stanford University for 28 years, the system was actually co-developed 15 years ago on a mainframe computer at the Stanford Artificial Intelligence Laboratory and at the computer music center of the Institut de Recherche et de Coordination Acoustique-Musique in Paris, France. "So many people were wanting to do the same thing (produce computerized musical scores) at home," Dr. Smith said, "it wasn't until the introduction of the Tandy 2000 that it was deemed practical to transfer the program to a small machine."

The intent of the system is to do for the music printing business what computerized typesetting has done for the general publishing business. The advantage of the system is that it allows the composer to print a "clean" copy of his manuscript without having to hand-write the score again.

The time saved by the computerized typography system depends on the complexity of the composition. According to Dr. Smith, he can produce a professional-looking score in about half the time it would take to transcribe the material. With his Tandy 2000 and the typography system, he can produce individual orchestral parts in about one-fifth the time.

Real-time response

"When I first began to transfer the system to the Tandy 2000, there were fears that a personal computer would never be fast enough for the type of screen editing users had been accustomed to on the mainframe," Dr. Smith said. "This fear has proved unfounded. Because of problems with mainframe tie-ups during peak periods, the Tandy 2000 actually gives faster 'real-time' response in most processing situations," he noted.

The main input consists of merely typing the names of notes, their rhythmic values and the various expression marks that are often connected to the notes. Notations such as clefs, key sig-
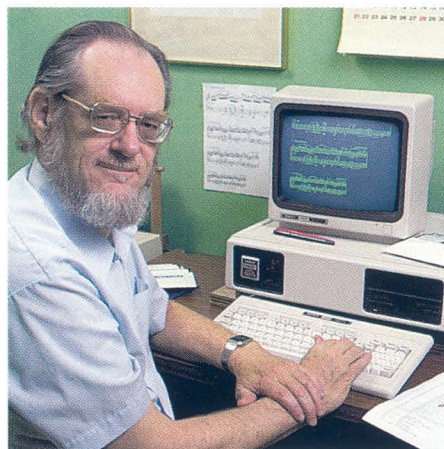
Dr. Leland Smith at the keyboard.

natures, slurs and ties are also entered in this manner.

The editing mode allows the user limitless detail which may be added and manipulated in any way. Measures can now be inserted or deleted with just the stroke of a key. Before, the composer would have to re-copy the entire page. Lyrics can also be added by using the system's editing mode. Even key signatures can be changed without ever having to touch the main body of the composition.

The new music typography system offers other innovations. Currently, quality manuscripts are produced by an engraving process. "The engraving process requires an artist to hammer each note into a plate using a shaped die," Dr. Smith explained. "Slurs are done either by hand or with a French curve. If the artist slips, they could easily ruin a whole day's work." He continued by saying that the plate is then used to make a proof which is then run through an art press, unlike a regular printing press. The print is then photographed and printed using a lithographic process.

The new system offers a short cut to this process by automatically spacing the music according to the traditions of music engraving, yet allowing enough flexibility to make a page of music meet the high standards of music publishing. Manuscripts may be printed on virtually any type of printer from an inexpensive dot matrix to professional laser systems.

Versatile application

An example of time savings can be seen in the works of Austrian composer Franz Schubert, which include approximatley 600 manuscripts bound in eight volumes by the process just described. According to Dr. Smith, each song was published in high, medium and low voices. "Every page of those eight volumes had to be engraved three times," Dr. Smith said. "With this system, you can take each page and say, 'Okay, this will be in the key of E flat and this one in the key of B flat' and the changes are minimal. You just change your key signatures and that's it. The main body of notes never has to be touched. To change a full page of music from one key to another could be done in five minutes or less."

The versatility of the computer music system lends itself to a wide variety of applications. In a project Dr. Smith recently completed for the Library of Congress, he produced large type musical scores for the visually impaired by using the system's editing mode.

Additional plans for the system include developing a method for blending it with Musical Instrument Digital Interface (MIDI) technology. This would allow the composer to automatically input into the computer what is played on the keyboard, thus producing an immediate rough draft of the composition. "The first steps in developing this system for a MIDI are very simple," Dr. Smith noted. "It becomes complicated when you start dealing with rhythms because everyone has their own interpretation. This is where you would need some elements of artificial intelligence. I have been doing a lot of thinking about how to get around this problem, but nothing has been done yet.

"The Tandy 2000 is the first small system I've used that gives the feel of mainframe computing," Dr. Smith added. "As a development tool and everyday workhorse, it has performed beyond my expectations."

Show and Sell

Computerized automobile "showrooms" in shopping malls increase customer interest for Ryan Motors.

Bob Carmack developed the computerized mall showroom concept based on his Design-A-Car program.

Faced with the task of familiarizing the public with the Mitsubishi line of automobiles, Bob Carmack, director of training and development for Ryan Motors Company/Oldsmobile, Mitsubishi, Porsche, Audi, Mercedes-Benz in Fort Worth, Texas, brought the cars to where the people were—shopping malls.

Carmack set up Ryan Motors' first temporary mall showroom in February 1985. However, instead of manning the portable showroom with salespeople, Carmack installed a few Tandy 1000 computers and printers to dispense information about the cars to prospective customers. "I wanted this venture to be a soft sell," he noted.

"People at malls are reluctant to talk to automotive salespeople. What they are really thinking is, 'I like the car, but can I afford it? Will someone tell me that'," Carmack stressed. The idea of using a computer as a sales tool had been percolating in his mind for a while. Over the past couple of years, Carmack developed a software program called Design-A-Car with an eye

toward using it for sales prospecting. "Programming is a hobby," explained Carmack, who founded and operated several businesses, including a jewelry company and an employment recruiting firm, before joining Ryan Motors seven years ago. At Ryan Motors, he has held many positions including salesman, sales manager and general manager, so he knows how people buy cars.

Going to the source

Carmack spent a year and a half writing the program, which he changed six times to make it easy to use for people with no computer experience. "I spent a lot of time on benches in malls talking and listening to people."

Although Carmack took a programming course in college, he had no other computer experience. In fact, he hated working with the punch card system at the college computing center. But when personal computers hit the market a few years ago, Carmack bought a Radio Shack TRS-80 Model III to learn more about working with

automated systems. As his children were already learning about computers in the second grade, he realized he would be left behind in the business world if he didn't acquire computing skills.

Later, when IBM-compatible systems became available, Carmack bought a Tandy 1000 and adapted his program to that system. When Design-A-Car was ready for commercial use, he acquired a few more Tandy 1000s to set up at mall showrooms.

During a typical three-day marketing event, the Tandy systems are set up in relatively private areas around a

Visitors in the mall showroom input their requirements for automobile purchase decisions.

booth. People interested in finding out about the cars follow the on-screen instructions, entering into the system the options they want in a car—amount of downpayment, trade-in value of their current vehicle and other specifications. Ryan Motors has a person on-site to help people only if they request assistance. The prospective customer leaves the showroom with printed information describing

"The system keeps me very organized."

the total cost of the car, the price of each option and the monthly payments under various financing options. The personalized print-out also includes a discount coupon and directions to the Ryan Motors dealership handling a particular make of car.

An advocate of computer literacy, Carmack thinks this system provides people with an interesting and somewhat unique introduction to using

computers. He chose the Tandy 1000 because he felt it is the system the majority of people passing through the display would be likely to use for personal computing. "It's affordable," he explained.

Results by the numbers

Carmack's innovative approach to delivering information to prospective customers is also delivering results for Ryan Motors. One of the largest automobile dealers in Texas, the company sold more than 6,500 new and used cars last year.

"We generate 300 to 1,200 prospects in a three-day event at a mall. And we sold two to three percent of the people participating in mall shows within 30 to 60 days," he reported. Participants generally enter their names and addresses, the type of car desired and whether they will be purchasing in 30, 60 or 90 days. Ryan Motors uses the Tandy 1000 to generate personalized letters which are mailed at appropriate intervals based on the buying dates indicated by the prospective customers. They also generate a separate prospect list for management personnel.

After seeing the sales results the computerized sales prospecting system produced for the company, Carmack is testing two other programs he developed—one for salespeople and one for dealership managers.

"Salespeople spend a lot of time on paperwork to keep track of clients and prospects. Most salespeople take names and telephone numbers down on slips of paper that are often lost," Carmack observed. His program called L.U.C.K. (Leadership Under Controlled Knowledge) helps salespeople automate their required tasks by providing a daily planner which reflects deliveries, appointments and contacts for a given day. This information is automatically retrieved from a database the individual creates which contains data on each client and prospect. The program also can globally change all records. "A salesperson can spend thirty minutes updating files in the Tandy 1000 that would take four or five hours to do manually," Carmack said.

The program also has the ability to calculate payments for lease versus purchase arrangements and for loans of differing terms and interest rates. Thus, critical financial information is

available to the sales force within a few seconds. Additionally, information on inventory and stock levels can be retrieved immediately.

With such information just a keystroke away, sales personnel can give the client or prospect immediate answers. "It makes the salesperson more professional. Through training and automation, I am aiming to change the image of automobile salespeople," Carmack stressed.

Natalie McCluskey is one sales associate who uses the program on a Tandy 1000. "I can figure out a lease versus purchase payment while I have the customer on the phone rather than having to call them back and find they've called another dealership," she said. Referrals are a key element in sales and McCluskey keeps in touch with clients every month, often sending them computer generated letters. "The system keeps me very organized," she said.
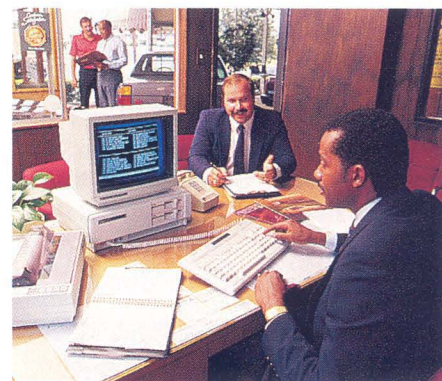
Ryan salesmen Greg Morris (left) and Earl Robinson confer on data for the L.U.C.K. program.

Management also notices

From management's perspective, Carmack's system tracks sales, inventory and the sales staff's performance. Specialized functions geared to managers include forecasting, sales reports and new hire evaluations.

Currently, sales personnel and managers purchase their own systems. Those who have opted to automate are among the company's top performers. Carmack reported excellent assistance from the Radio Shack Computer Center on Alta Mere Road, right across from Ryan Motors and he doesn't think it will be too long before other members of the Ryan sales team call on Radio Shack. "They've been watching the results," Carmack noted with a grin.

Punching it out with personal computers

FABRI-CENTER

Interfacing microcomputers to numerical controlled devices became a reality, even though *they* said it couldn't be done.

The Tandy 2000 has become a vital part of Jack McIntyre's machine tool operations.

Jack McIntyre could be characterized as a cross between Ernest Hemingway and the character Broderick Crawford portrayed on the classic TV series *Highway Patrol*. So you would expect him either to be maintaining law and order on the highways or sport fishing for marlin off the Florida Keys.

Although he prefers the sport fishing scenario, these days McIntyre is busy wrestling with a local area network rather than hauling in marlin. As secretary/treasurer of Weldments of Florida, Inc., a firm that shears, bends and punches holes in sheet metal, McIntyre has invested countless hours and thousands of dollars to mesh his plant's automated numerical control devices with the latest computer and communications technology.

His efforts are beginning to pay off handsomely now that the Tandy ViaNet local area network has become the backbone of both the office operation and the increasingly automated machine shop. Without any formal training in programming, McIntyre, with a lot of help from a friend, developed applications for what has become a very sophisticated system.

"You'd be surprised how fast you learn something when you have to pay the rent," McIntyre said, summing up his accomplishments. Once he sets his mind to doing something, McIntyre is hard to hold back. That same mindset was in high gear 17 years ago when he and his wife founded the business. Prior to that time, McIntyre was sell-

...people would tell us the technology wasn't there...

ing steel for U.S. Steel Corporation and National Steel Corporation, a job he did for 16 years. "I decided I didn't want to work for a big company anymore," he said. What he decided to do instead was start a welding and steel punching business. "I had to learn to do it from scratch. We kept doing it until we got it right," he recalled.

After buying a large automated punch press, the company began to grow rapidly and McIntyre became interested in acquiring a computer to help run the operation. "I was told

computers were wonderful so I got one (a Radio Shack TRS-80 Model I) and I plugged it in and the screen looked at me and I looked at it and I said 'do something'."

The task begins

Quickly overcoming this naive approach, McIntyre set about writing a program to develop the coordinates that directed the computer numerical control machine where to punch the holes in a certain size piece of steel. Enlisting the help of a friend, a programmer who is legally blind, McIntyre said, "We would write a section of the program and then see if it worked."

It wasn't too long before McIntyre became impatient to find a way to transfer the coordinates directly into the punch press machine instead of having the computer system transfer the information to a paper tape punch machine. "At computer shows, people would tell us the technology wasn't there," he said. However, after upgrading to a TRS-80 Model III, McIntyre was able to accomplish this feat. Then came the Tandy 2000 that provided the speed necessary for loading directions into the punch press.

After clearing that hurdle, McIntyre was still dissatisfied because only one task could be run on a system at a time and employees could not access the same information from all locations in the plant. For example, employees often have to check to see whether a particular part is in inventory to advise a customer how long it will take to deliver an order. "I kept thinking there had to be a way to tie the computers and punch press machinery together. I had read about this technique and went to Radio Shack to see if they could modify the computers to do this." As a result of his discussions with Radio Shack in November, 1984, McIntyre's company became one of the first users of the ViaNet local area network, which had just been introduced by Radio Shack.

The advent of hard disk drives for personal computers and ViaNet's communications software have made the establishment of local area networks not only feasible but also relatively easy to install. Weldments of Florida's network is located in two separate adjacent buildings. Even though the company had to run some cable underground, McIntyre reported that the installation went smoothly.

Real job control

Because ViaNet manages the access of data from various storage locations on the network, employees no longer have to worry about where information is located; they can work at any of the nine Tandy 2000s in the plant and print out information at any printer. "It is completely, *completely* transparent to employees," McIntyre stressed. Today, Weldments of Florida has about 125 megabytes of data stored on both internal and external hard disk units.

McIntyre likes the security of the network. Only designated people have access to the process for managing the storage of data. At the end of the day, the system backs up all the files and stores them on a disk.

"ViaNet has helped us increase our business by 25 to 30 percent, because employees can work from any Tandy 2000. Without the network, we would
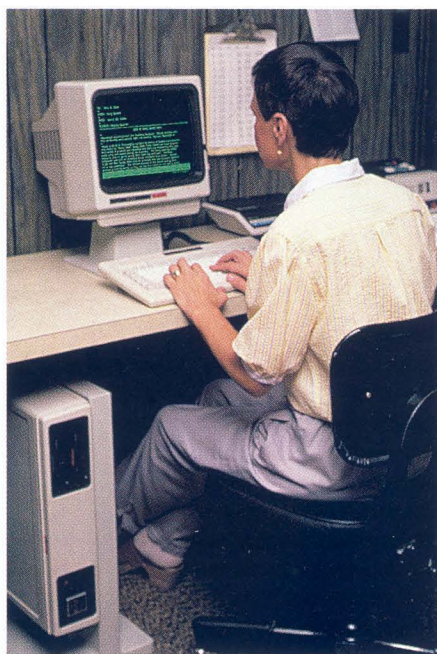
Office Manager Joan Gorski checks the statistics and inventory for a job.

have to go back to floppies," McIntyre observed. At any one time, there are 40 or 50 jobs running in the plant. Each job has a folder which outlines the inventory needed, how long the job took, whether there are machine tool tapes for that job and other vital information. With ViaNet, all information is on-line and available at any system in seconds.

McIntyre credits the Radio Shack store on North Federal Highway in Fort Lauderdale managed by Jim Hopkins with keeping him up to the

minute on ViaNet upgrades and service for his equipment.

Now that ViaNet is up and running, McIntyre is busy tweaking its efficiency. Because he thought loading a high volume of machine tool coordi-

...you are almost forced to use computers...

nate numbers directly into the punch press slowed down the network, McIntyre attached a Tandy 2000 to the main punch press. Now the network transmits job orders to the dedicated 2000, which, in turn, communicates orders and job status to the punch press. At first, machine operators resisted learning how to use the computer but now they won't do without the computers, McIntyre said. Ideally, he would like to have all his machine tool units directly connected to a computer, but as he said, "I don't have enough time for programming."

Continuing refinements

Another recent addition to the applications software was a program to summarize information from the time clock. This program tracks both employees time records and the time they spent on each job.

As a long time user of Tandy computers, McIntyre is particularly impressed with the ease of transferring the application software to each new system upgrade. And he is amazed at the durability of the computers. The machine shop is a very dirty, noisy environment. "When we can't see the screens anymore, we wipe them off or vacuum them and they are fine," he said.

McIntyre is clearly proud of what he has been able to do with his ViaNet network, but he is surprised when people tell him how sophisticated his system is. "With automatic punching equipment, you are almost forced to use computers," he said. "But once you get started on a computer, there's no stopping. You become like a farmer. All you want is the land adjacent to yours."

McIntyre insists that what he'd really like to do is retire; that is, as soon as he gets the next application up on the network.

Tandy Data Processing: Automating from the inside out

Tandy DP management (from left) James Bews, Carroll Leu and Henry Tieding discuss in-house reports.

Tandy computers play a vital role in the processing of manufacturing data and store inventory for the company's more than 6,000 Radio Shack Stores and Computer Centers.

The old tale about the cobbler's children being last in line for a new pair of shoes doesn't hold true at Tandy Corporation, especially when it comes to microcomputers. Tandy was the first company to mass-market microcomputers, beginning with the TRS-80 Model I introduced in 1977. As soon as these revolutionary devices became available, Tandy data processing personnel began developing applica-

tions to automate critical business functions.

"If it makes sense and will save us money, we automate," explained Carroll D. Leu, vice president and manager of Tandy Data Processing. Tandy's manufacturing system and store operating system/inventory system (SOS) are two sophisticated applications that are an integral part of corporate operations today.

Specialized groups within Tandy's data processing organization developed each system according to specifications set by the company's accounting department. This ensures that the systems deliver the information that serves the entire corporation.

Both the manufacturing and SOS systems had been on the wish lists of managers within the corporate data processing operation, but were not financially feasible until the arrival of the microcomputer era. "Tandy management has always wanted to automate the business operation of the factories, but prior to micros, it was cost prohibitive," said James D. Bews, data processing manager for the Manufacturing Group.

Similarly, Henry Tieding, manager of the SOS/Inventory System Group, began experimenting with a way to beat the mail costs between headquarters and retail outlets and had developed the prototype of the SOS on a

Model I. After senior management saw a demonstration of the system, they gave Tieding's group the go-ahead for further development and implementation. Today, SOS runs on a variety of Tandy microcomputer equipment, but generally uses the Tandy 2000.

The advent of hard disk-based micros allowed these systems to evolve to a high level of sophistication. In fact, both managers report that colleagues at other firms are surprised to learn micros can handle such complex applications.

Modules for manufacturing

In developing the manufacturing system, Bews and his group took a modular approach. Tandy's factories are specialized and therefore relatively small, self-contained units that have varying information requirements. The modular approach provided the flexibility to tailor reports to each factory's information needs. "Some factories want to track materials at each step of the manufacturing process, and others just want to see completed work exploded into components and relieved from work-in-process," Bews explained.

The system's individual modules include bill of materials; perpetual inventory; tracking of purchase orders to vendors; materials requirements planning (MRP), which translates customer orders into finished goods and explodes that demand to raw material requirements, arranging these requirements into variable time frames; and order entry and billing.

Programmers in Bews' department wrote the manufacturing system in COBOL. All programs are controlled centrally and distributed to the factories for use on Tandy 6000 multiuser computer systems. A multiuser system is ideal in the factory environment because one person can be entering purchases, while another person keys material pulls from stock and a third user inspects personnel statistics, Bews said.

His group implemented the system in one factory at a time, rather than blitzing the entire manufacturing operation. This method allowed them to be sure each factory's system was tuned to its own needs and that personnel were properly trained.

The key to the system's ease of use is its extensive menu orientation which prompts users through tasks and has certain functions customized to each factory's reporting requirements. Automating the factory operation is so important to Tandy that as soon as it acquires a new factory, installing the manufacturing system is one of the first priorities.

The information gathered at the factory is backed up on the Tandy 6000 daily and transmitted regularly to the corporate mainframe for accounting purposes. "The biggest benefit of the system has been its help to the factory purchasing departments," Bews said, adding that now factories can operate with less raw material inventory on hand.
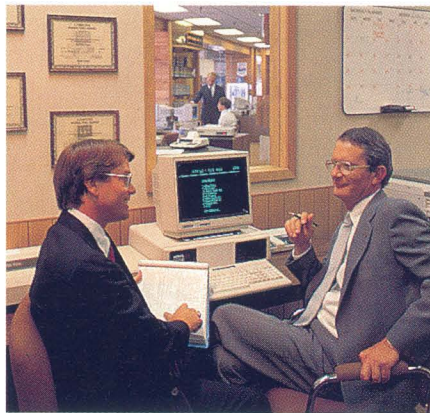
Radio Shack Computer Center Manager Doyle Wells (left) reviews SOS procedures with DP's Henry Tieding.

Even though Tandy's factories are up-and-running on their own microcomputer hardware systems, Bews' group maintains, enhances and controls all the manufacturing programs at one central location.

On-line advantages

Like Bews, Henry Tieding is enthusiastic about the results the SOS system has produced for Tandy. Essentially, the system is a distributed data processing network for Tandy's Radio Shack retail outlets and repair depots, and Scott/McDuff and Video Concepts stores. Each outlet's computer (usually a Tandy 2000) uses a copy of the system, which contains fifty functions including accounting procedures and an electronic mail capability. Retail operations use the system to transmit orders, daily reports and financial data to corporate headquarters.

"Our original objective was to eliminate the post office," Tieding said, noting that a physical inventory sent by each store to headquarters cost six to ten dollars. Inventory was only a part of the total mail communications.

With over 6,000 retail outlets, postage costs were astronomical. Transmitting the same information today costs about fifty cents per outlet.

But the cost saving is only part of the reward of the SOS program. Prior to initiating the system, store orders were mailed to the warehouses, frequently submitted in handwritten format. Upon implementation of the system, store orders were transmitted to headquarters electronically, then forwarded to the appropriate warehouses. Unexpectedly, stores began receiving orders five days faster than usual. Why? Because warehouse personnel could now easily read the orders!

The heart of the SOS system is its uniformity and communications handling, Tieding explained. The system automatically controls the sending and receiving of information from stores and insures information is complete prior to transmission. Thus, store managers and headquarters alike are assured of complete information, including daily financial reports, electronic mail transmission and mandatory print-out materials.

Regimented flexibility

On the other hand, the system also offers flexibility. Informational tasks do not have to be performed at a particular time. Additionally, store managers can file financial reports closer to the end of the sales cycle and replenish inventory on shorter notice.

Processing physical inventory used to take until the fifteenth of the month, but now inventory reports are complete by the end of the fourth day of the month. Most store managers report they complete their daily reports in less than twenty minutes per day compared to the two or three hours it took prior to automation.

Tieding enjoys tossing out mind-boggling statistics about the system. In a one-year period, the system processsed 2.1 million phone calls consisting of 9 billion characters of information. A central computer, which is capable of handling 240 simultaneous phone calls, is dedicated to the communications functions.

Both the manufacturing and SOS programs have evolved and expanded in complexity in proportion to advances in microcomputer technology. As Tieding succinctly put it, "If we had to go back to paper, we couldn't run our business."

Inroads in education: ESTC leads the way

Two former educators with a mission put form and logic into a revolutionary new learning system.

The advent of personal computers has been accompanied by frequent promises of "electronic classrooms" that would vastly improve the nation's education system. For the most part, however, these predictions have fallen far short of the claims that personal computers would become the ultimate teaching tool.

Rising to meet that challenge, two educators, Cecil Hannan and Burl Hogins, formed Education Systems Technology Corp. (ESTC) two years ago.

Today, the San Diego, California-based firm employs 110 people and is aggressively pursuing the kindergarten through sixth grade education market with an innovative software product which operates on a network of Tandy 1000 SX and Tandy 3000 personal computers.

Founders Hannan and Hogins are no strangers to the field of education. Hannan, ESTC chairman of the board, wrote the Elementary and Secondary School Education Act that was instituted by President Lyndon B. Johnson in the 1960's. He also has more than twenty-five years experience in writing computer applications for both administrative and education systems.

Hogins, ESTC's vice-president, has broad experience in curriculum development as both an educator and designer of educational material. He is also an author with more than thirty textbooks to his credit.

Goals and a mission

When the two decided to form a company to help educators, they couldn't help but focus their attention on personal computers. The goal of ESTC is to use computers to help students develop higher order thinking skills such as inference, application, analysis and synthesis, explained Sally Zoll, manager of client support for the firm.

With the help of venture capital funding, ESTC hired a group of experienced educational consultants with specialties in mathematics and reading to help establish the educational parameters of the firm's mission. The consultants, in turn, hired educators to create lesson plans to help students achieve ascending levels of proficiency in reading and mathematics. ESTC's programming department then took these written lesson plans and coded them into computer programs designed for students in grades K-6.

But this was not simply a case of putting school book learning onto a computer screen. The ESTC curricula is not merely text-oriented. It is highly interactive. Headphones and a voice board have been added to each Tandy 1000 SX-based system to allow students to receive verbal as well as visual instruction. Each Tandy 1000 SX also has a mouse input device which allows students to respond to questions or exercises on the screen by choosing from a series of possible answers during a learning session.

This method is especially useful for young children who might be concerned about correct spelling and other details that aren't part of the comprehension skills of a particular lesson.

Students can progress at their own pace in an atmosphere that complements traditional learning concepts.

More than just text

Before a program has been coded for text, it passes to ESTC's ten-person art department that creates a family of cartoon-like characters and integrates them into the lesson. Like most of the schools using ESTC's software, the art staff also uses Tandy 1000s and a drawing program called PC Paint Brush, to create the appropriate graphics and characters. Once the programming staff completes its portion of the pro-

gram, ESTC's quality assurance department uses its Tandy systems to test the lesson's ease of use and accuracy in teaching a particular skill.

Laboratory setting

ESTC installs its systems in learning labs that are capable of networking up to 32 computers. Lessons are designed to complement and augment what students are already learning in their traditional classrooms. "Our intent is never to replace, but to support and supplement what is taught in the classroom," said Zoll.

ESTC conducted beta tests at the Lindo Park Elementary School in Lakeside County, California, near San Diego using 32 Tandy 1000s linked through networking software to a Tandy 3000 computer, which serves as the system manager. It utilized a 292 megabyte storage system with high speed tape backup. Besides the actual hardware, ESTC provides a complete package of computer instruction which includes: trained personnel to supervise the computer labs; leased educational courseware (software) consisting of expansive mathematics and reading lessons for grades K-6; and a report facility that prints each student's progress in computer-aided learning. An important advantage of the ESTC system is that students progress through the lessons at their own pace, learning through individual sessions with the computer.

Below is an example of an ESTC problem in a grade 5-6 reading lesson with instructions to select answers pertinent to hibernation. The choices are displayed on the screen in a column that runs beside the text.

Hibernation—When winter comes, many animals fly south where there is food and warmth. Other animals deal with winter differently. They find warm places away from the cold—like caves. These animals sleep all winter. They live off of their fat. These animals hibernate.

1) Animals must eat a lot of food before they hibernate.

2) Animals sleep during hibernation to use up fat more quickly.

3) Animals that hibernate don't need food or warmth like birds.

Once a student begins a lesson on one of the networked computers, a file space is created on the hard disk to track where a student ended a session. Thereafter, when the student returns to the lab and types in his or her name, the computer displays a response, greeting the student by name. Although the systems are networked, the Tandy 1000 SXs can be used as standalone personal computers if, for example, a student wants to write a story or a teacher needs to draft a report.
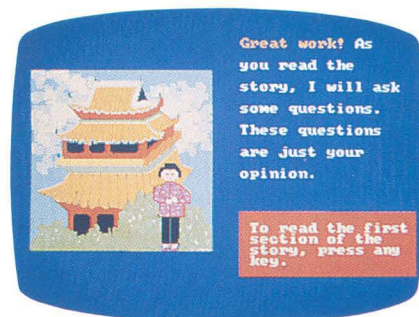
Colorful graphics combined with text help to enhance the students' computer-based learning experience.

Learning plus

Not only does the system keep track of each student's progress, it also times each computer to assure that learning sessions end within about twenty-five minutes. When the session is two minutes from closing, and the student is finished, a drawing program appears on the screen.

Each Tandy 1000 SX computer is configured with a color monitor and mouse that students use to create their own masterpieces by selecting from a palette of sixteen colors and patterns on the screen. At the Lindo Park Elementary School, a chorus of moans could be heard in the lab as the computer automatically ended the session so the lab could be cleared for the next group of students.

"The Tandy 1000 SX is a fantastic instrument for education," noted Zoll, explaining why ESTC chose Tandy computers. "We like what Radio Shack has done in education. We looked at who had an educational base and wide exposure—they had that."

William E. Cavanaugh, ESTC's vice president of sales added, "With its network of stores and computer centers, Radio Shack offers an ideal combination of training and service. It's a strategic alliance for us."

ANS-1186

Radio Shack service and support: Teamwork makes it happen

Union Camp, one of the nation's largest paper producers, headquartered in Savannah, Georgia, requires specialized ARCNET applications for its remotely located operations.

The U.S. Army National Training Center at Fort Irwin, California, needs hardware that will stand up under adverse conditions during field maneuvers.

The Pinellas County, Florida, Schools want special arrangements to service their computers with minimum interruption in classroom and administrative usage.

Most of our customers have minimal support requirements which can be met by our service options. We recognize, however, that special cases like those above may occur which require specific needs.

To insure that we can help our customers meet their computerization goals, Radio Shack's National Technical Support and Training Group serves as a valuable resource in helping the company's field service and support functions solve customers' problems. The NTST provides formal training for field service center personnel and keeps them informed with diagnostic and technical information. The group also monitors the pulse of the user community through input from the field and interfaces with various groups at Radio Shack.

It is through the combined efforts of the National Technical Support and Training Group and field support that Union Camp, the Army and the Pinellas schools were all able to meet their computer needs.

Radio Shack customer support doesn't stop at simple solutions. Whether a customer's problem is logistics, negative environmental conditions or power issues, if the problem can be solved, Radio Shack's support team will get the job done.